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FEDERAL AID IN FISH RESTORATION  
AND  
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INVENTORY AND CATALOGING

G-I-Q-B Lee M. Neimark and Mark W. Schwan

ALASKA DEPARTMENT OF FISH AND GAME  
Don W. Collinsworth, Commissioner  
Division of Sport Fish  
Richard Logan, Director  
Juneau, Alaska

Compiled and Edited by: Laurie M. Weidlich, M.A.

Composed by: Rebecca J. Lean

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Volume 24

Study No. G-I-Q-B

STATE OF ALASKA

Bill Sheffield, Governor

Annual Performance Report for

HARVEST ESTIMATES OF SELECTED FISHERIES  
THROUGHOUT SOUTHEAST ALASKA

by

Lee M. Neimark  
and  
Mark W. Schwan

ALASKA DEPARTMENT OF FISH AND GAME  
Don W. Collinsworth

SPORT FISH DIVISION  
Richard Logan, Director



## RESEARCH PROJECT SEGMENT

State: Alaska Name: Sport Fish Investigations  
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Project No.: F-9-15

Study No.: G-I Study Title: INVENTORY & CATALOGING

Job No.: G-I-Q-B Job Title: Harvest Estimates of  
Selected Fisheries  
Throughout Southeast  
Alaska

Cooperators: Lee M. Neimark and  
Mark W. Schwan

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## ABSTRACT

Juneau Area Marine

A creel survey program was conducted from May 1 through September 26, 1982, to estimate the sport fishing effort and harvest of Juneau area boating anglers and to determine the contribution of facility reared salmon stocks and tagged wild salmon stocks to the sport fishery. Two technicians interviewed returning marine anglers at local harbors and boat ramps to obtain effort and catch data for each sampled boat. Periodic aerial surveys sampled the total fishing boat activity during the survey season.

Juneau area marine boating anglers expended an estimated 215,000 angler-hours of effort to catch 3,657 chinook salmon, Oncorhynchus tshawytscha (Walbaum), 15,427 coho salmon, O. kisutch (Walbaum), 10,571 pink salmon, O. gorbuscha (Walbaum), 165 chum salmon, O. keta (Walbaum), 0 sockeye salmon, O. nerka (Walbaum), 881 Dolly Varden, Salvelinus malma (Walbaum), 11,495 Pacific halibut, Hippoglossus stenolepis (Schmidt), and 840 rockfish (family Scorpaenidae). These estimates exclude Derby effort and catch.

The 36th Golden North Salmon Derby was held August 13, 14, and 15, 1982. There were 9,067 angler validations for this 3-day event. Estimates of the numbers of salmon entered and taken home are as follows: 1) chinook, 407 entered and 609 taken home, 2) coho, 1,640 entered and 3,680 taken home, and 3) pink, 500 entered and 1,487 taken home. In addition, an estimated 1,171 halibut were taken home during the Derby.

## KEYWORDS

Creel survey, harvest estimate, catch, effort, recreational fishery, derby, Juneau, Alaska, salmon, bag limit, size limit.

## BACKGROUND

The allocation of resources to multiple user groups often presents problems for resource managers. In the Juneau area, there has been a long history of user conflicts and increasing angling pressure on fish stocks. Marriott et al. (1979) documented these problems in the Juneau sport fishery and also succinctly described the trend in the recreational fishery regulations toward more restrictive bag and possession limits.

Creel sampling programs have been implemented for estimating the angling effort and catch by sport anglers and for determining the contribution of salmon from enhancement projects in the Juneau area to the saltwater sport fishery (Robards, 1978; Marriott et al., 1979; Schwan, 1980; 1981). The Juneau boat sport fishery should continue to be monitored because of possible allocation conflicts among different user groups. Allocation problems cannot be resolved, or even clearly elucidated, if the harvest of a resource by a particular user group goes unmeasured.

Figure 1 presents a map of the 1982 study area and Table 1 contains a list of the common names, scientific names, and abbreviations of the species mentioned in this report.

## RECOMMENDATIONS

### Management

1. Reevaluate the 28 inch minimum size limit for chinook salmon.

### Research

1. Develop a comprehensive and consistent creel survey methodology to be used by all southeast Alaska regional sport fish offices. This methodology should include the timely filing of all data in a central computer for rapid retrieval and analysis.
2. Evaluate the effects of the 1983 size and bag limit regulations on the Southeast Alaska chinook sport harvest.
3. Determine the sport fish catch rates and harvests by fishing area on a weekly basis for in-season monitoring.
4. Develop a model to forecast the chinook and coho season harvest from weekly harvest data.



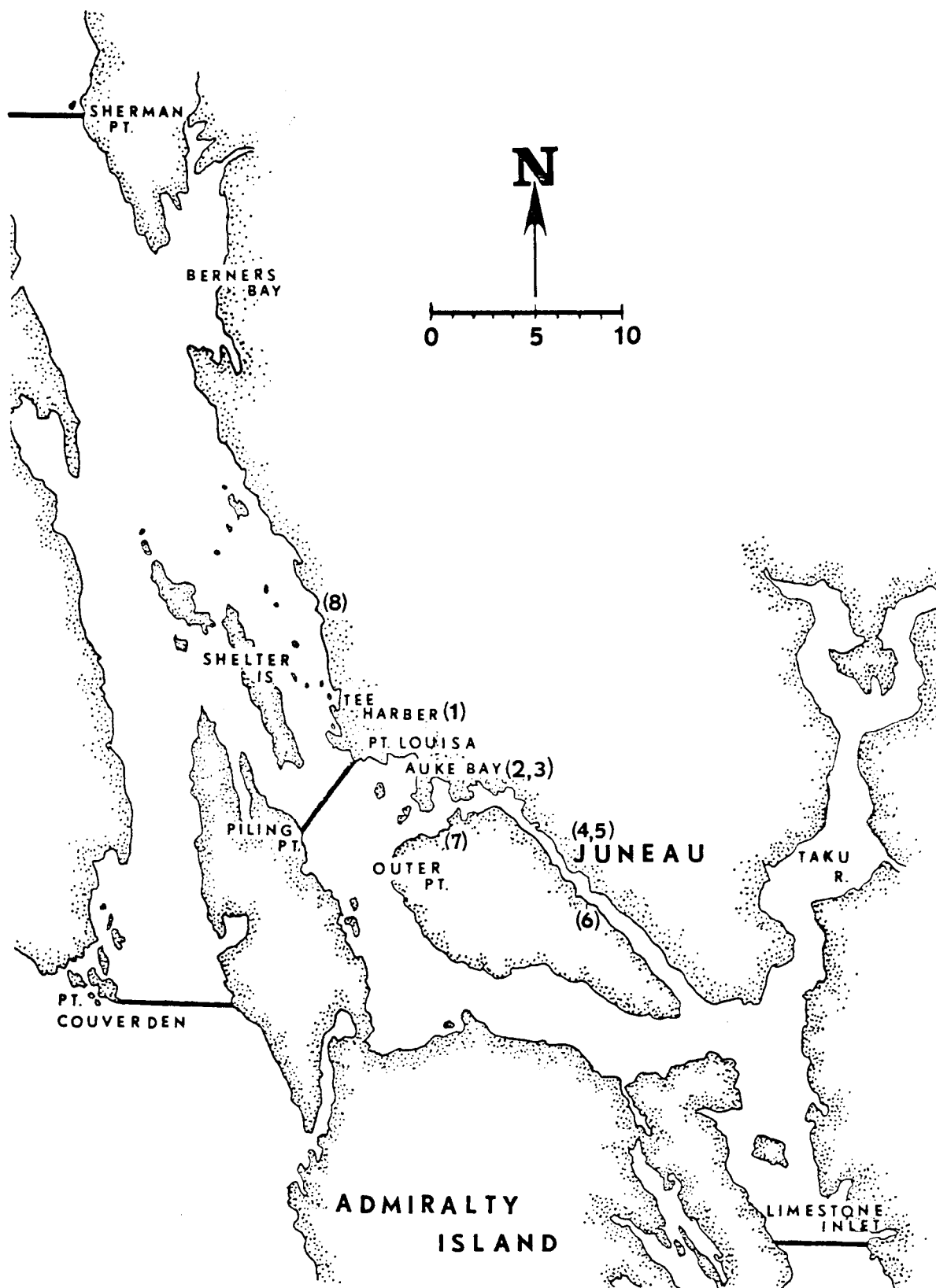


Figure 1. Map of the Juneau Area Marine Recreational Fishery and Creel Survey.

Locations: 1) Tee Harbor; 2) Auke Bay; 3) Fisherman's Bend; 4) Aurora Harbor; 5) Harris Harbor; 6) Douglas Harbor; 7) North Douglas Boat Ramp; 8) Amalga Harbor.

Table 1. List of common names, scientific names, and abbreviations.

Common Name	Scientific Name and Author	Abbreviation
Pink salmon	<u>Oncorhynchus gorbuscha</u> (Walbaum)	PS
Chinook salmon	<u>Oncorhynchus tshawytscha</u> (Walbaum)	KS
Chum salmon	<u>Oncorhynchus keta</u> (Walbaum)	CS
Coho salmon	<u>Oncorhynchus kisutch</u> (Walbaum)	SS
Sockeye salmon	<u>Oncorhynchus nerka</u> (Walbaum)	RS
Dolly Varden	<u>Salvelinus malma</u> (Walbaum)	DV
Pacific halibut	<u>Hippoglossus stenolepis</u> Schmidt	H
Rockfish	<u>Scorpaenidae</u>	RF

5. Determine the percentage of mature chinook in the sport fish harvest by area and by time and determine the age, size distributions, and origin of those mature chinook.

#### OBJECTIVES

1. Determine the saltwater boating angling effort and catch of sport fishes in the Juneau area, which includes estimating the contribution of hatchery stocks via recovery of micro-wire tagged fishes.

#### TECHNIQUES USED

##### Juneau Recreational Harvest Study

##### Marine Boat Recreational Harvest Study:

Saltwater anglers fishing from boats were interviewed upon their return to local harbors and boat ramps from May 1 through September 26, 1982. Boating parties were asked if they had engaged in recreational fishing during their outing. If so, the number of anglers in the boating party was recorded. Each angler was asked; 1) how long they had fished, 2) what the target species was, 3) the areas fished, 4) the number and species of fish kept, and 5) the number, if any, of undersized chinook salmon caught and released.

Biological data were taken from certain fish in the creel. Scale samples, fork lengths, and weights were taken from all chinook salmon when possible. Fork lengths were recorded from Pacific halibut. Chinook and coho salmon were checked for missing adipose fins; the heads from such fish were collected and the micro-wire tags were removed at a later date.

Creel technicians stationed themselves at a specific harbor or ramp from noon until dusk on the sampling day. All traditional public access points were covered. However, those harbors and ramps known to support light angler access were sampled less frequently. Access points were put into three strata: Auke Bay, Tee Harbor, and "Other". The "Other" stratum included Amalga Harbor, Fishermen's Bend, Aurora Harbor, Harris Harbor, North Douglas ramp, and Douglas Harbor (Figure 1).

Each week, Auke Bay was covered on 2 randomly selected weekdays and 1 randomly selected weekend day. Tee Harbor was covered two or three times a week on randomly selected days. "Other" access points were also sampled once or twice each week, again 1 randomly selected weekday and/or 1 randomly selected weekend day. The specific harbor within this composite stratum was selected randomly; however, during the spring south-end closure on chinook angling, south-end harbors were not covered.

##### Estimation of Total Effort and Catch:

One-hour flights were conducted over the Juneau marine, recreational fishing area throughout the survey season. Flight days and flight times

were picked on a random basis; however, days were stratified into weekdays and weekends/holidays. The number of boats seen with poles out were counted during the flights, which represented the total angling effort in the area for that hour.

An estimate of total marine angling effort for the season was determined in the following way:

$$A\hat{H}_i = (\bar{c}_i)(\bar{a}_i)(\bar{h})(d_i)$$

where:  $i$  = stratum (weekdays or weekends/holidays)

$\bar{c}_i$  = mean count of boats/hr for stratum  $i$

$\bar{a}_i$  = mean count of anglers/boat for stratum  $i$

$\bar{h}$  = mean hours in the fishing day (11 hours)

$d_i$  = days in the season for stratum  $i$

$A\hat{H}_i$  = estimate of angler hours in stratum  $i$

$$\text{then: } A\hat{H}_{\text{season}} = \sum A\hat{H}_i$$

Estimates of harvest for the various species of game fishes were generated by multiplying the season catch rate (catch per angler-hour or CPUE) for a species by the estimated total seasonal effort (angler-hours). Seasonal catch rates used for estimating harvest were determined by taking the total seasonal sample catch of each species and dividing it by the total sampled effort (for all targeted species) intercepted all season at all sampled access points.

#### Golden North Salmon Derby

The 36th Golden North Salmon Derby was held on August 13, 14, and 15, 1982. Fish and Game personnel were stationed at the official Derby weigh-in stations (judges' floats) at Auke Bay, Tee Harbor, and Douglas Harbor, where they identified and weighed all salmon entered in the weight competition. When possible, fork lengths were recorded and scales were collected from chinook salmon. Salmon entered for door prizes were identified and chinook salmon measured for legal length (28 inches) requirements. All fish were examined for missing adipose fins and any such fish were tagged using surveyor's tape for quick recognition at the local cold storage facility. When intercepted at that time, their heads were severed and saved. Micro-wire tags were removed at a later date. Numbers and poundage of Derby fish were obtained from cold storage personnel.

Derby anglers were interviewed as to how many and what kinds of fish they were taking home. When possible, take home salmon were examined for missing adipose fins. Using the information gathered, take home ratios for

each species caught each day were calculated by dividing the number of anglers interviewed into the sampled catch by species.

The number of angler validations (representing angler-trips) at each location for every day was obtained from Derby officials. These figures were then multiplied by the corresponding sample take home ratios to estimate the take home catch for each species. Daily catches were summed to obtain a total catch per species at each individual harbor. Catches by anglers from each harbor were then summed to obtain the total take home during the derby. No sampling was conducted to determine mean trip length for derby fishermen. Based on day length and running times, we considered 6 hours to be a reasonable approximation.

#### Estimation of the Contribution of Tagged Stocks

The following equation was used to estimate total tagged fish of a particular species caught in the sport fishery:

Starting with the relation:

$$\frac{\text{Marked fish in sample}}{\text{All fish in sample}} = \frac{\text{Est. of total marked fish caught}}{\text{Est. of all fish caught}}$$

Then, the estimate of total marked fish caught equals

$$\frac{\text{Marked fish in sample} \times \text{Est. of all fish caught}}{\text{All fish in sample}}$$

This equation is analogous to the Peterson Index, which is based on the assumption that the sample accurately represents what is found in the entire population (Ricker, 1975).

Estimating the contribution of a facility (hatchery) release of fish to a fishery, where the total release is known and not all fish are marked but the marked portion is known, can be done by multiplying the estimated number of marked fish caught in the fishery by the ratio of total fish released to the number of marked fish released. That is:

Contribution to fishery =

$$\text{Est. total marked fish caught in fishery} \times \frac{\text{total release}}{\text{marked release}}$$

## FINDINGS

### Results

An estimated 269,402 angler-hours of effort were expended during the survey season, May through September, 1982. The resulting estimated catches were: 4,670 chinook salmon (mean length = 787 mm, SD = 114.4 mm), 20,747 coho salmon, 12,600 pink salmon, 180 chum salmon, and 0 sockeye salmon.

Additionally, 881 Dolly Varden char, 12,666 Pacific halibut (mean length = 758 mm, SD = 262.7 mm), and 837 rockfishes were harvested by Juneau boat anglers during this harvest study season (Table 2). These estimates include effort and catches during the 36th Golden North Salmon Derby.

The weekly catch rates are shown in Table 3 and are compared to past years data on chinook and coho in Appendix A, Tables 1 and 2.

Tag recovery data are presented in Table 4, indicating the tag codes which appeared in the fishery and the estimated contributions of select stocks to the Juneau marine sport fishery during 1982. No significant contribution by enhancement projects to the chinook, coho, or pink salmon sport fisheries was detected.

### Discussion

#### Effort:

Local anglers went fishing on an estimated 57,027 marine boat-trips during the May through September, 1982, season. This figure includes a record 9,067 trips (angler validations) during the 36th Golden North Salmon Derby (Table 5).

Juneau area anglers expended 269,402 angler-hours of effort this season. Excluding the Derby, an estimated 215,000 angler-hours were expended in the May through September 1982, marine boat fishery, compared to 202,431 hours expended during 1981.

Exceptional fishing and good weather likely contributed to this increase. Still, effort has not regained 1977-1980 levels (Figure 2).

#### Catch:

Chinook. The best fishing for chinook occurred during the third week in June, when it took an average of 11 hours of salmon angling to catch one legal chinook. Overall, chinook fishing remained poor this season, with a catch rate of 40 hours per legal chinook. However, the 1982 catch rates did follow a trend toward slightly improved chinook fishing (Figure 3).

Restrictive regulatory actions aimed at rebuilding the local Taku River chinook run might help explain any improvement. However, Juneau sport anglers are harvesting Taku River chinook only during the spring (April through late June) as maturing fish are returning to the river. A wide array of chinook stocks, primarily immature feeders, are harvested during all times of the fishing season as well.

Predictions were that the return of chinook to the Taku River during 1982 would be reduced, owing to environmental disasters during 1978 and 1979 that greatly reduced production in important chinook rearing areas of the Taku system (Kissner, 1982). Escapement surveys supported the forecast (Kissner, unp. ms.). The spring chinook sport fishery (April through mid-June) was indeed consistently below average (Appendix A, Table 1).

Table 2. Estimates of Total Catch in 1982 Marine Sport Juneau and Derby Fisheries.

	KS	KS*	SS	PS	RS	CS	DV	H	RF
May-September Recreational Harvest	3,654	3,222	15,427	10,571	0	165	881	11,495	840
36th Golden North Derby	1,016	...	5,320	1,987	0	15	...	1,171	...
TOTAL	4,670	3,222	20,747	12,578	0	180	881	12,666	840

\* Released chinook salmon, including those less than 711 mm (28 inches) in total length from June 15 through September 30.

Table 3. Weekly CPUE in the Juneau Marine Sport Fishery, 1982.

Start Date	% Effort Targeting on Salmon	% Effort Targeting on Halibut	CPUE (HOURS/FISH BASED ON TARGET HOURS FISHED)					
			Chinook	Small Chinook (released)	Coho	Pink	Dolly Varden	Halibut
5/03	90	10	91.9	275.6	...	...	...	15.2
5/10	83	17	33.8	388.3	...	...	...	9.2
5/17	91	9	33.8	473.8	...	...	473.8	...
5/24	70	30	30.8	755.7	...	...	503.8	7.8
5/31	67	33	24.5	220.8	883.3	...	80.3	7.8
6/07	70	30	22.9	119.8	222.5	1,557.3	311.5	6.4
6/14*	74	26	24.4	19.1	163.8	1,146.8	45.9	4.9
6/21	65	35	11.1	39.9	74.1	172.8	43.2	6.3
6/28	69	31	50.3	41.2	18.9	5.8	64.7	4.0
7/05	73	27	56.9	74.0	18.3	5.0	59.2	4.2
7/12	71	29	75.2	33.4	11.5	3.5	120.4	3.5
7/19	74	26	46.3	49.3	7.7	8.9	206.0	4.7
7/26	73	27	48.0	90.9	8.8	8.4	2,545.8	5.6
8/02	83	17	68.9	60.6	3.6	8.7	...	3.2
8/09**								
8/16	73	27	91.2	27.9	5.0	23.5	...	5.1
8/23	66	34	27.0	25.5	4.0	71.0	...	4.8
8/30	60	40	78.3	33.0	4.7	156.6	...	4.6
9/06	60	40	21.0	15.9	4.5	261.9	...	4.2
9/13	67	33	59.0	43.3	8.2	649.5	...	5.3
9/20	43	57	15.8	59.1	13.9	...	...	4.0
5/01-9/27	69	31	40.0	45.2				5.4
5/17-8/01							101.5	
6/28-9/05					6.1	8.8		

\* 28" minimum size limit in effect for chinook June 15 through March 31.

\*\* Derby week; normal sampling suspended (see Derby results).



Table 4. Summary of CWT hatchery chinook salmon, wild chinook, and wild coho salmon captured in the Juneau marine sport fishery, 1982.

Species	Brood* Year	Facility/ Wild (W)	Binary Code/ Fin Clip	Agency	Date and Location of Release	Marked Fish in Release Group	Total Release	Creel Sample Rec.	Derby Sample Rec.	Vol. Rec.	Estimated Tagged Fish Caught in Fishery	Estimated Stock Contrib. to Fishery
KS	78	Kitimat	AD/ 2-16-14	CFSO	5/79 Kitimat River, B.C.	73,436	151,770	1	0	1	6	13
KS	78	Atnarko	AD/ 2-17-32	CFSO	7/79 Atnarka Hatch., B.C.	79,761	79,761	0	0	1	...	...
KS	78	Squamish (W)	AD/ 2-17-34	CFSO	5/79 Squamish River, B.C.	72,115	74,254	1	0	1	6	7
KS	77	Quinsam	AD/ 2-17-36	CFSO	6/78 Quinsam River, B.C.	50,140	234,443	0	0	1	...	...
KS	78	Quinsam	AD/ 2-17-59	CFSO	5/79 Quinsam Hatch., B.C.	97,316	751,910	1	0	0	6	49
KS	sp 77	LPW	AD/ 3-16-31	NMFS	4/79 Little Port Walter	5,358	5,440	0	1	0	2	3
KS	sp 78	LPW	AD/ 3-17-10	NMFS	5/80 Little Port Walter	31,367	31,650	0	0	2	...	...
KS	sp 78	LPW	AD/ 3-17-14	NMFS	5/80 Little Port Walter	10,085	10,176	0	0	1	...	...
KS	sp 76	Crystal Lake	AD/ 4-16-16	ADFG	6/77 Blind Slough	71,227	166,030	0	0	1	...	...
KS	sp 76	Taku R. (W)	AD/ 4-17-13	ADFG	10/77Taku River	6,134	...	0	0	1	...	...
KS	sp 79	Taku Inlet (W)	AD/ 4-19-20	ADFG	5/81- 6/81 Taku Inlet	3,397	...	0	0	1	...	...
KS	sp 77	Taku R. (W)	AD/ 4-17-28	ADFG	9/78-11/78 Taku River	31,376	...	0	0	1	...	...
KS	sp 79	Taku R. (W)	AD/ 4-20-01	ADFG	6/81 Taku River	1,553	...	0	0	1	...	...
KS	sp 79	Crystal Lake	AD/ 4-20-42	ADFG	5/81 Crystal Creek	18,530	19,989	0	0	1	...	...
KS	79	Crystal Lake	AD/ 4-20-43	ADFG	5/81 Crystal Creek	18,682	20,153	0	0	1	...	...
KS	79	Snettisham	AD/ 4-20-49	ADFG	5/81 Port Snettisham	23,569	26,746	0	0	1	...	...
SS	78	Snettisham	AD/H4-04-00	ADFG	7/79 Speel River	8,796	...	0	1	0	3	...
SS	76-79	Auke Creek (W)	AD/ 3-17-29	NMFS	5/81- 6/81 Auke Creek	6,372	...	0	1	4	3	...
SS	77-79	Auke Creek (W)	AD/ 3-17-50	NMFS	5/82- 6/82 Auke Creek	6,245	...	0	0	1	...	...
SS	80	L. Port Walter	AD/ 3-17-52	NMFS	6/82 Auke Creek	5,005	5,005	0	0	1	...	...
SS	78	Berners (W)	AD/ 4-20-15	ADFG	6/80 Berner's River	10,145	...	0	0	1	...	...

\* sp = spring spawning

Table 5. Comparison of Golden North Salmon Derby angler effort and catch estimates, 1971-1982.

Year	Dates Held	Angler Validations	Chinook Salmon		Coho Salmon		Pink Salmon		Chum Salmon		Sockeye Salmon		Halibut	
			Entered	Taken Home	Entered	Taken Home	Entered	Taken Home	Entered	Taken Home	Entered	Taken Home	Entered	Taken Home
1971	July 16-18	7,434	682	...	1,331	...	409	...	226	...	...	...	...	...
1972	July 21-23	8,199	528	...	1,817	...	328	...	123	...	...	...	...	...
1973	July 20-22	7,915	637	...	449	...	278	...	34	...	...	...	...	...
1974	July 26-28	7,714	291	...	1,526	...	226	...	24	...	...	...	...	...
1975	July 18-20	7,847	276	184	315	354	174	531	15	14	0	0	...	...
1976	July 23-25	8,466	136	167	536	1,135	58	96	4	12	1	0	...	...
1977	Aug. 05-07	8,762	161	355	1,206	2,419	259	55	28	1	1	0	...	...
1978	Aug. 11-13	8,283	210	40	1,779	1,076	122	98	13	9	0	0	...	...
1979	Aug. 03-05	8,327	350	657	663	2,561	98	242	52	44	0	5	490	...
1980	Aug. 22-24	7,386	271	206	694	1,583	67	145	97	33	0	0	502	...
1981	Aug. 07-09	7,524	436	437	541	1,223	104	186	22	3	0	0	1,002	...
1982	Aug. 13-15	9,067	407	609	1,640	3,680	500	1,487	15	...	0	0	1,171	...

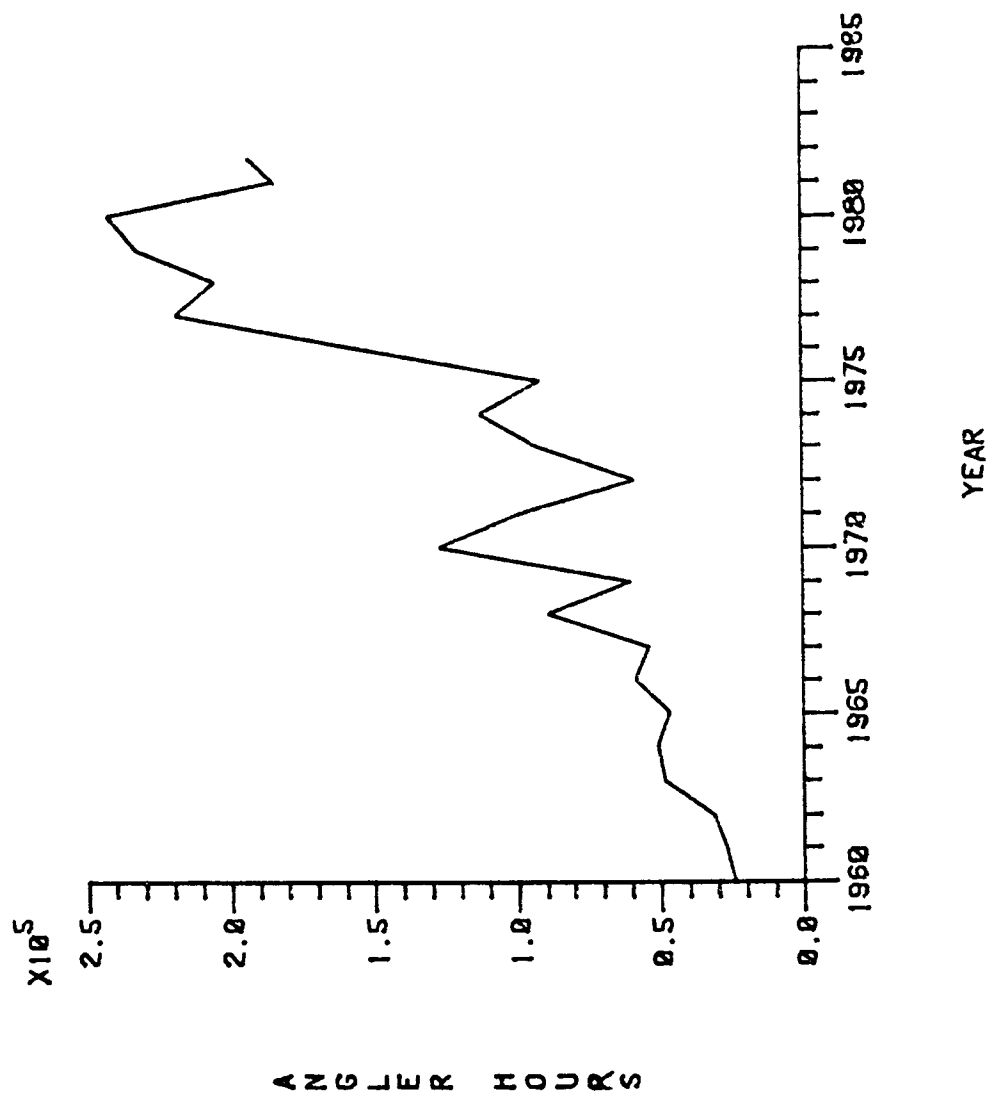


Figure 2. Seasonal Angler-Hours in the Juneau Marine Sport Fishery, May 1-September 3, 1982. (Excludes Salmon Derby Angler Hours.)

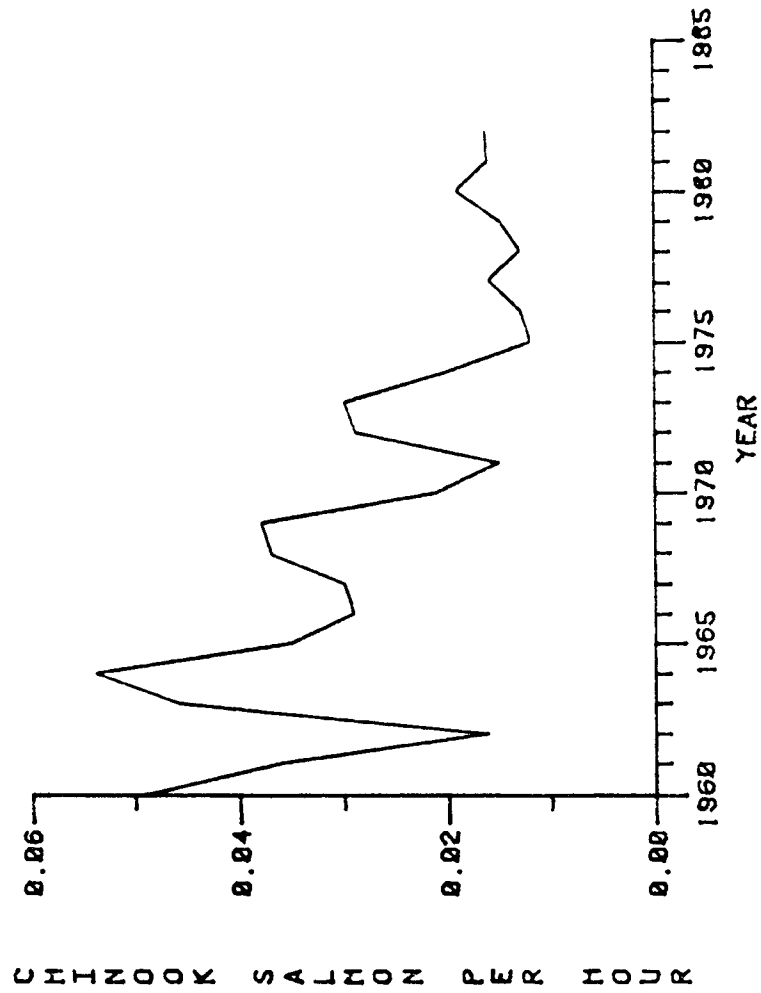


Figure 3. Seasonal Mean Catch Rates for Chinook in the Juneau Area Sport Fishery, 1960-1982. (Based on Non-Derby Hours Fished for All Species.)

By late July, the commercial troll fishery was prohibited from harvesting chinook because their quota of 237,000 fish had been attained. It is hard to directly assess how this closure affected angling success of Juneau sport trollers. There was, independent of any effect owing to troll closures, an increased availability of legal and sublegal feeder chinook in Southeast waters during 1982. Additionally, large schools of herring frequented local waters throughout much of the mid and late season, likely attracting and holding migrating salmon.

Coho and Pink Salmon. A record high harvest of coho salmon and pink salmon occurred during the 1982 season. During mid to late July, pink salmon were so numerous throughout the north end that some anglers could not get their bait or lures away from the bite of the pink salmon. Many pinks were released.

Preliminary data indicate the commercial harvest of coho salmon, by all gear types, was approximately 2.1 million. This is the largest harvest since 1951 (staff Board Report, Commercial Fish Division, 1982). Juneau sport trollers harvested approximately 21,000 coho salmon, a record high for local sport anglers. The sport fishing catch rates increased from 3 coho/100 angler-hours in 1981 to 11 coho/100 angler-hours in 1982 (Figure 4). The parent year, 1978, adult return was very strong, with over 2 million coho taken in the regional commercial fisheries and 16,697 harvested in the sport fishery (Marriott, et al., 1982).

Again, the abundance of herring in local waters likely "held" coho salmon to places like Outer Point, Whitemark, Favorite Reef, and South Shelter Island, all popular sites for Juneau sport trollers.

One of the intentions of the Commercial Fish Division's in-season management plan is to allocate more coho salmon to inside users by way of mid-season commercial troll closures (5AAC 33.365). There is no evidence to substantiate that the closures created an allocative shift, though the closures should benefit inside harvesters, as well as spawning streams. Yet, escapement surveys for spawning coho in local systems indicated mixed levels of returns. The Berner's system had the largest count since statehood (7,505), but the Taku River spawning tributaries appeared to have received relatively few spawning cohos (Commercial Fish Division, unp. data).

Halibut. Approximately 31% of the seasonal marine sport effort was directed toward the taking of bottom fish, primarily Pacific halibut. There was very little effort for halibut during May and catches were poor, but by June the fishery picked up, in both angling success and hence interest. Catch rates during the rest of the season remained near or better than one fish per 5 hours of bottom fishing, meaning that on the average, a halibut angler was catching one fish per angling-trip. This is the best seasonal catch rate on record.

Some exceptionally large halibut were landed, but once again, the majority of fish caught were juveniles. The mean fork length of sampled sport caught halibut, 758 mm, was comparable with the last few year's data (Table 6).

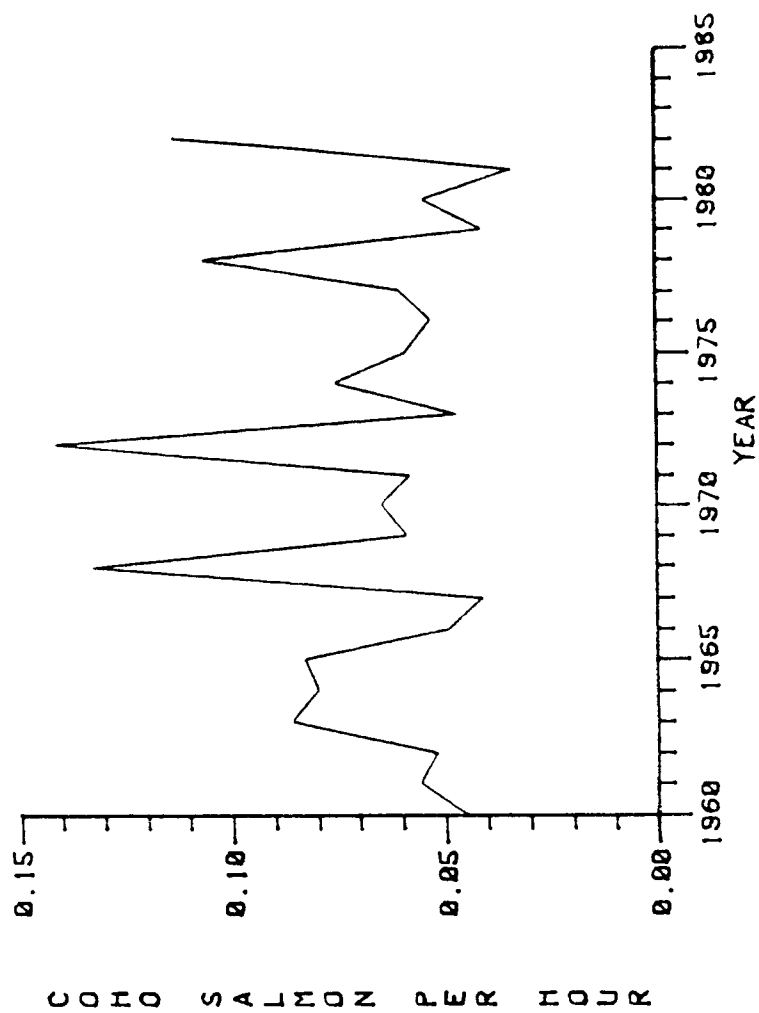


Figure 4. Seasonal Mean Catch Rates for Coho Salmon in the Juneau Area Sport Fishery, 1960-1982. (Based on Non-Derby Hours Fished for All Species.)

Table 6. Comparison of halibut size, 1980-1982.

Year	Mean Length (mm)	Weight (Kg*)	Sample Size	Standard Deviation (mm)
1980	771	5.3	537	243.9
1981	780	5.4	325	291.7
1982	758	5.2	533	262.7

\*Estimated weight from length.

Rockfishes. The estimated catch of rockfishes was less than 1,000 (840) fish. Recent years' catch estimates of local rockfish harvests have been drastically below estimates generated from the Statewide Harvest Questionnaire (approximately 5,000 in 1981) (Mills, 1982). The disparity in harvest estimates needs to be explained. It is likely that many anglers responding to the Statewide Harvest Questionnaire are not able to identify rockfishes (family Scorpaenidae) from sculpins, greenlings, ronquils and other demersal marine species. Whatever the reason, it is important to accurately assess the harvest of rockfishes, for they are highly susceptible to over-harvest (Carlson and Haight, 1972).

Dolly Varden. The marine boating angler does not target on Dolly Varden. The species is taken incidentally in the salmon sport troll fishery. Local anglers are likely to catch Dolly Varden from Juneau roadside systems and the fish originating in systems like the Taku, Berner's, and possibly even Chilkat/Chilkoot systems (with assumably healthy Dolly Varden stocks). There is much controversy over the status of local Dolly Varden populations and rather restrictive regulations have been imposed on Juneau anglers regarding the harvest of local Dolly Varden in hopes of building up the local stocks. In order to better assess local Dolly Varden stock abundance and the effect of restrictive sport regulations, the Juneau management staff is constructing a weir at Montana Creek and reactivating a roadside creel survey program.

#### Management:

The creel survey provides useful information on the harvest of marine species; however, this information may also be obtained from questionnaires mailed to license holders. In the past, creel survey and questionnaire estimates of harvests have had close agreement. Questionnaire data are obtainable at less cost, but are currently of no use in answering many regulatory questions. The Alaska Department of Fish and Game, Sport Fish Division, must comment on proposed sport fishing regulatory changes which are under consideration by the Board of Fisheries. Creel survey data are an invaluable tool for evaluating and predicting the effects of regulatory changes. Following are analyses of three proposals for regulatory changes addressed by the Board in January 1983. (These analyses were prepared with 1981 Juneau creel data because the 1982 data had not been entered into a computer file and, therefore, could not be thoroughly analyzed before the Board meeting. The 1982 data set is now stored on a computer tape and, next year, data will be entered into a computer file and processed weekly.)

Two rods per angler. One proposed regulation change would have permitted anglers to fish two rods instead of one. This proposal was submitted by an individual who wanted to increase the poor efficiency of chinook anglers. Creel data indicated that approximately 85 percent more chinook would be harvested if the proposal was accepted.

This estimate was obtained after examining the catch rates of boats with 1 through 5 anglers, the observed range of party size (Table 7). Under the proposed regulation, a solitary angler could fish two rods, thereby increasing his efficiency from 0.12 to 0.20 chinook per trip, an increase of 70%.



Table 7. Chinook catch rate per boat trip by party size in 1981.\*

Party Size	Rods Fished	Chinook Harvested Per Boat Trip
1	1	0.12
2	2	0.20
3	3	0.29
4	4	0.48
5	5	0.55

\* Regulations restrict anglers to a single rod.

Similarly, parties with two anglers could increase their efficiencies to 0.48 chinook per trip by fishing four rods. Parties of three or four anglers would also likely fish four rods, as more than four lines trolled behind an average size sport-boat would tend to tangle.

Assuming: 1) that all solitary anglers would fish two rods,  
2) that parties of two, three, and four anglers would fish four rods,  
3) that parties of five would continue to fish five rods,  
the increased efficiency of the sport fleet was estimated (Table 8). The increased efficiency of each party size group was weighted by that group's contribution to the total chinook harvest (Table 9).

Thus, the net effect of the proposed regulation would be an 85% increase in the chinook harvest. The Board of Fisheries rejected this proposal because increasing the sport harvest is contrary to their goal of conservation to rebuild the depressed chinook stocks.

Chinook Daily Bag Limit. Creel data were also used to support a sport fish staff proposal to standardize a complex, unenforceable system of chinook salmon daily bag limits. The limits ranged from one to three chinook, dependant the upon date and location. Analysis of the 1981 Juneau data and data from the statewide harvest questionnaire indicated that standardization of the daily bag limit at one, two, or three chinook would not significantly affect the harvest.

Despite the fact that bag limits are imposed on individual anglers, successful anglers will typically continue to fish until every party member has obtained a limit. During 1981, approximately 50,000 marine boat angling-trips occurred in Juneau waters. About one in nine of these resulted in the successful landing of a legal sized chinook salmon for a total harvest of 5,200. Only one fourth of the 5,200 successful anglers were on boats that "limited out." It is this fraction of the angling population, 1,300 fishermen, who had to stop fishing, being truly restricted by the one chinook bag limit (Figure 5a).

With a two chinook salmon daily bag limit, the 1,300 limited fisherman would have been allowed to catch an additional salmon. Since the probability of catching a chinook was one in nine, 144 of the anglers could have been expected to harvest an additional chinook. Thirty-six of these anglers would be in parties which "limited out." They would be restricted by the two chinook salmon limit (Figure 5b).

With a three chinook salmon daily bag limit, these 36 fishermen would probably have harvested an additional 4 chinook (Figure 5c).

Similar calculations were performed throughout the region in areas where the bag limit ranged from one to three chinook. Standardizing the bag limit at two chinook region wide would probably have increased the Southeast harvest of sport caught chinook by less than 200 fish (1%).

This analysis assumes that the probability of catching a second or third chinook salmon is the same as the probability of catching the first

Table 8. Projected chinook catch rate and increased fishing efficiency if anglers could fish two rods. (Compare with Table 7.)

Party Size	Rods That Would be Fished	(Projected) Chinook Harvest Per Boat Trip	Increased Efficiency
1	2	0.20	0.70
2	4	0.48	1.40
3	4	0.48	0.70
4	4	0.48	0.00
5	5	0.55	0.00

Table 9. Projected increase in the chinook sport harvest if anglers could fish two rods.

Party Size	Increased Efficiency	Percentage Contribution to the Chinook Harvested	Projected Harvest Increase
1	0.70	0.05	0.03
2	1.40	0.40	0.56
3	0.70	0.37	0.26
4	0.00	0.16	0.00
5	0.00	0.02	<u>0.00</u>
Total			0.85

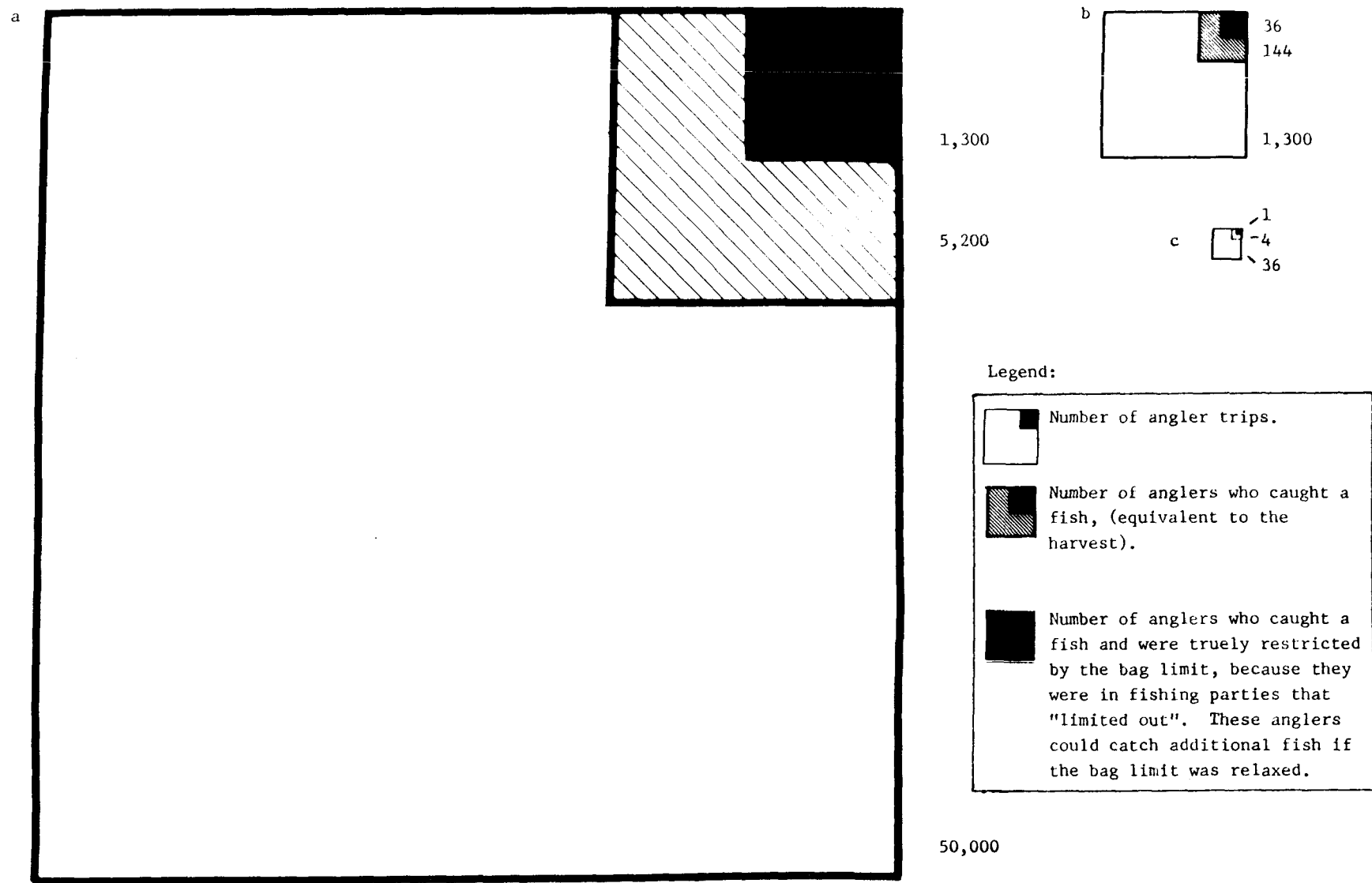


Figure 5. Effects of the King Salmon Bag Limit on the Juneau, 1981, Harvest.

- a. The one king salmon bag limit. Harvest = 5,200 kings.
- b. The two king salmon bag limit. Additional harvest = 144 kings.
- c. The three king salmon bag limit. Additional harvest = 4 kings.

chinook. An objection to this assumption is that it is the superior (or lucky) angler who catches a chinook. He should have a higher than average probability of catching additional chinook.

This objection was not validated by creel census data from areas having a daily bag limit of three chinook. While this data base is incomplete, some statistics for the Ketchikan area in 1979 and 1980 were available. In 1979, 10% of the anglers caught a chinook salmon. Their odds of catching a second chinook remained constant at 10%, but did rise to a 15% chance of catching a third salmon. In 1980, the anglers' odds of catching the first, second, and third chinook fell dramatically from 25% to 9% to 8%, respectively. Therefore, it is likely that the analysis presented here does not underestimate the effects of increasing the bag limit.

Additional support for the estimated effect on harvest comes from catch-per-unit-effort statistics. On the average, it took the successful Juneau angler 5 hours to catch a chinook during 1981. Since the average fishing trip lasted 5 hours, it is doubtful that increasing the bag limit would have had much effect on the harvest.

During their January 1983 meeting, the Alaska Board of Fisheries adopted a region wide daily bag limit of two chinook salmon. During the coming season, creel survey programs will be conducted throughout Southeast to assess the actual impact of this regulatory change on the chinook harvest.

Chinook Minimum Size Limit. The third analysis evaluated a public proposal to reduce the chinook 28 inch minimum size limit to 20 inches. (This regulation change would have had the same effect as removing the size limit entirely, since almost no chinooks under 20 inches are caught.) Creel data indicate that between 5,000 and 15,000 undersized chinook salmon are returned to the water each year by sport anglers. A model was developed to determine the fate of these fish returned to the sea (Appendix B). If the proposal was accepted, sport anglers could realize an estimated 55% increase in harvest, with less than a 1% reduction in either the commercial harvest or the spawning escapement. Nonetheless, to avoid any reduction in escapement, and to avoid any controversy regarding even an insignificant allocation shift from commercial to sport anglers, the Board rejected the proposal.

#### LITERATURE CITED

- Carlson, H. R., and R. E. Haight. 1972. Evidence for a home site and homing of adult yellowtail rockfish, Sebastes Plavidus. Journal of the Fisheries Research Board of Canada. 29: 1011-1014.
- Kissner, P. D., Jr. 1981. A study of chinook salmon in southeast Alaska. Alaska Department of Fish and Game. Annual Report. 1980-1981, Project F-9-13, 22 (AFS-41).
- Kissner, P. D., Jr. 1982. A study of chinook salmon in southeast Alaska. Alaska Department of Fish and Game. Anadromous Fish Studies Annual Performance Report. AFS-41-10. 53pp.

Marriott, R. A., A. E. Schmidt and D. E. Jones. 1979. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1978-1979. Project F-9-11 20(G-I-Q). 58 pp.

Mills, M. J. 1982B. Alaska Statewide sport fish harvest studies (1981). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1981-1982, Project F-9-14, 23 (SW-I-A). 115pp.

Ricker, W. E. 1975. Computation and interpretation of biological statistics of fish populations. Bulletin 191, Fisheries Research Board of Canada. 382 pp.

Robards, F. S. 1978. Harvest estimates of selected fisheries throughout Southeast Alaska. Alaska Dept of Fish and Game. 1977-1978, Project F-9-10, 19(G-I-Q). 48 pp.

Schwan, M. W. 1980. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21(G-I-Q-B). pp 16-62.

\_\_\_\_\_. 1981. Harvest estimates of selected fisheries throughout southeast Alaska and Anadromous, Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22(G-I-Q-B). pp 23-46.

Prepared by:

Approved by:

Lee M. Neimark  
Fishery Biologist

E. Richard Logan, Director  
Sport Fish Division

Mark Schwan  
Fishery Biologist

Mark C. Warner  
Sport Fish Research, Chief

## APPENDIX A





Appendix A

Table 1. Comparative chinook salmon caught per angler hour of effort during the Juneau area marine recreational fishery.

Period	1	2	3	4	5	6	7	8	9	10	11	12	Seasonal
*Dates	5/01- 5/14	5/15- 5/28	5/29- 6/11	6/12- 6/25	6/26- 7/09	7/10- 7/23	7/24- 8/06	8/07- 8/20	8/21- 9/03	9/04- 9/17	9/18- 10/01	10/02- 10/15	Mean
1960	.092	.047	.072	.063	.065	.033	.020	.031	.008	.000	...	...	.049
1961	.051	.064	.060	.034	.036	.029	.035	.020	.005	...	...	...	.036
1962	.022	.033	.030	.014	.003	.014	.034	.008	.015	...	...	...	.016
1963	.090	.089	.086	.048	.060	.045	.030	.019	.020	.013	...	...	.046
1964	.075	.070	.065	.053	.045	.078	.039	.022	.013	...	...	...	.054
1965	.055	.069	.059	.028	.027	.037	.032	.014	.013	...	...	...	.035
1966	.000	.036	.026	.033	.027	.020	.022	.028	.034	...	...	...	.029
1967	.008	.031	.045	.035	.032	.025	.019	.012	.018	...	...	...	.030
1968	...	...	.028	.033	.036	.048	.035	.028	.023	...	...	...	.037
1969	...	...	.036	.047	.048	.034	.033	.030	...	...	...	...	.038
1970	...	...	.046	.025	.016	.028	.015	.017	.013	...	...	...	.021
1971	.014	.041	.052	.038	.032	.034	.033	.040	.027	.015	...	...	.015
1972	...	...	.016	.031	.023	.033	.029	.049	.024	.028	...	...	.029
1973	.050	.029	.032	.035	.048	.057	.029	.012	.023	...	...	...	.030
1974	.007	.017	.015	.036	.031	.017	.018	.014	.017	.017	...	...	.020
1975	.030	.018	.034	.022	.018	.030	.007	.007	.002	.004	.004	...	.012
1976	.023	.026	.024	.030	.020	.016	.007	.006	.006	.003	.002	.000	.013
1977	.015	.032	.023	.025	.011	.016	.010	.001	.003	.003	.000	...	.016
1978	.037	.029	.024	.023	.008	.004	.005	.001	.004	.002	.000	...	.013
1979	.032	.037	.019	.016	.009	.021	.010	.004	.008	.004	.001	...	.015
1980	.028	.036	.033	.024	.019	.013	.014	.010	.008	.010	.009	...	.019
1981	.036	.024	.025	.020	.013	.016	.009	.007	.008	.006	.004	...	.016
1982	.019	.023	.029	.015	.024	.014	.012	.008	.019	.019	.027	...	.017

\* Actual dates for each period may slightly vary between years.

Appendix A

Table 2. Comparative coho salmon caught per angler hour of effort during the Juneau area marine recreational fishery.

Period	1	2	3	4	5	6	7	8	9	10	11	12	Seasonal
	5/01-	5/15-	5/29-	6/12-	6/26-	7/10-	7/24-	8/07-	8/21-	9/04-	9/18-	10/02-	Mean
*Dates	5/14	5/28	6/11	6/25	7/09	7/23	8/06	8/20	9/03	9/17	10/01	10/15	(6/26-9/03)
1960	.000	.000	.003	.002	.003	.009	.055	.065	.092	.034	...	...	.045
1961	.000	.000	.000	.001	.006	.042	.079	.054	.100	...	...	...	.056
1962	.000	.000	.000	.010	.002	.014	.034	.086	.126	...	...	...	.052
1963	.000	.000	.002	.006	.020	.044	.102	.145	.121	.143	...	...	.086
1964	.000	.001	.002	.004	.035	.041	.099	.095	.131	...	...	...	.080
1965	.000	.000	.015	.007	.026	.074	.093	.114	.108	...	...	...	.083
1966	.000	.000	.001	.002	.019	.028	.049	.085	.063	...	...	...	.049
1967	.000	.000	.000	.006	.015	.019	.034	.074	.063	...	...	...	.041
1968	...	...	.000	.061	.072	.119	.143	.149	.232	...	...	...	.133
1969	...	...	.000	.012	.026	.030	.081	.099	...	...	...	...	.059
1970	...	...	.002	.002	.021	.042	.057	.100	.106	...	...	...	.065
1971	.000	.000	.002	.005	.013	.038	.080	.087	.073	.196	...	...	.058
1972	...	...	.000	.051	.093	.102	.237	.127	.133	.120	...	...	.142
1973	...	.000	.005	.006	.023	.023	.034	.061	.096	...	...	...	.047
1974	.000	.002	.001	.008	.044	.066	.087	.089	.092	.133	...	...	.076
1975	.000	.000	.004	.002	.025	.036	.061	.097	.066	.081	.060	...	.059
1976	.000	.000	.002	.006	.029	.040	.054	.063	.079	.065	.060	.005	.053
1977	.000	.001	.000	.013	.044	.081	.068	.058	.056	.045	.016	...	.061
1978	.000	.000	.000	.015	.065	.092	.129	.143	.106	.065	.055	...	.107
1979	.000	.000	.000	.002	.014	.037	.039	.043	.090	.078	.003	...	.041
1980	.000	.000	.001	.001	.015	.047	.068	.089	.083	.057	.060	...	.055
1981	.000	.000	.000	.000	.021	.034	.046	.085	.101	.067	.018	...	.034
1982	.000	.000	.002	.007	.069	.084	.112	.147	.153	.105	.031	...	.113

\* Actual dates for each period may vary slightly between years.

## APPENDIX B



A model was developed to determine the utility of an existing regulation requiring anglers to release chinook under 28 inches in length (Appendix B, Figure 1).

Assumptions:

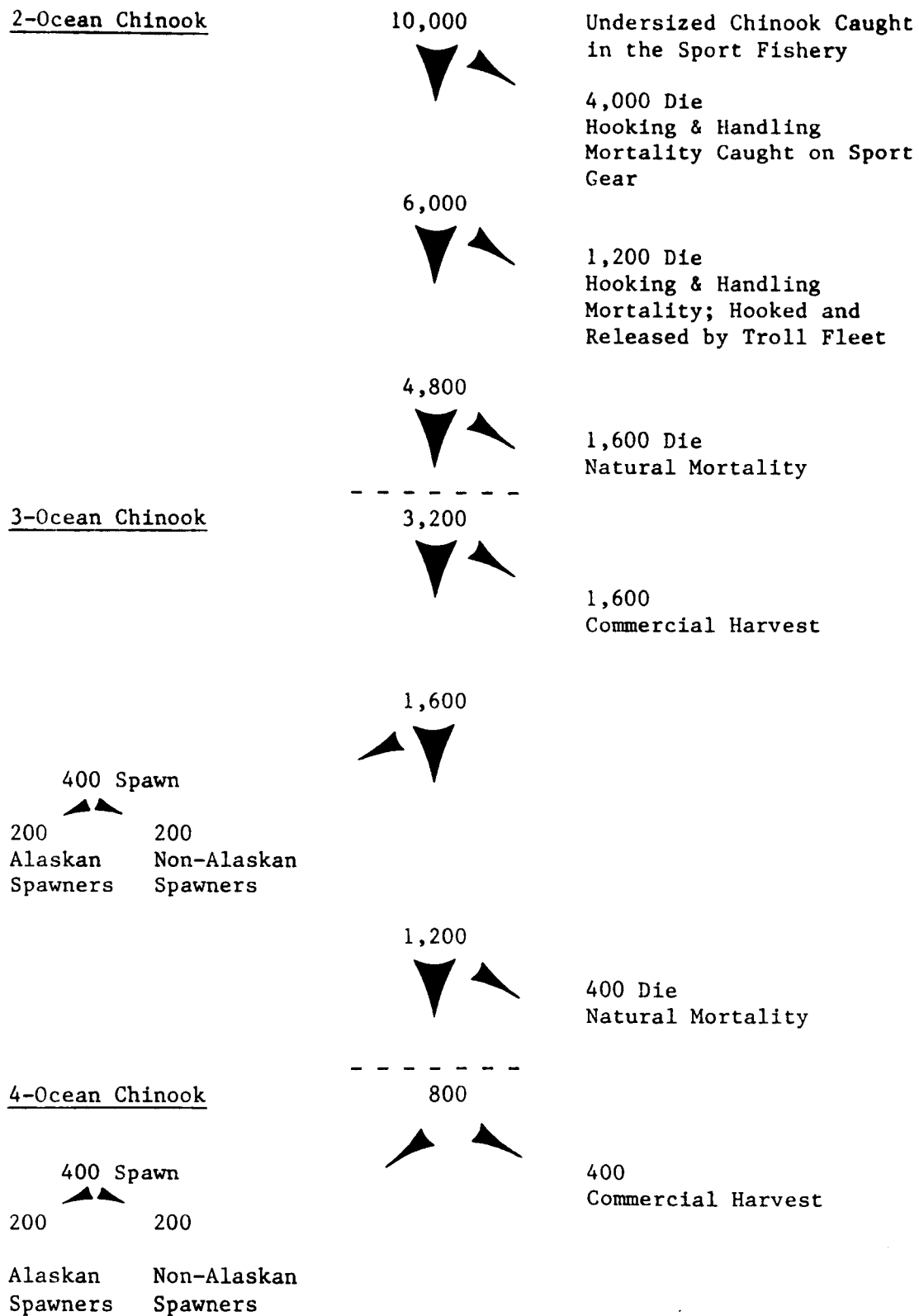
1. Forty percent of the released fish will die from injuries received during hooking and handling.
2. The commercial fisheries will harvest about 50% of the stocks in each legal sized year class (>70% overall harvest ratio).
3. One third of the stocks will suffer natural mortality each year.
4. About one quarter of the surviving 3-ocean and half of the surviving 4-ocean fish will spawn. Using this assumption in the model yields equal numbers of 3- and 4-ocean spawners. This has been observed, but will vary each year and in each river.
5. About half of the chinook stocks in Alaskan waters will spawn in Canada.

Appendix B, Table 1 summarizes the results of the model. While 20% (2,000) of the original 10,000 released chinooks would survive to be harvested by the commercial fishery, and 8% (800) would survive to spawn, a startling 72% (7,200) of the released chinooks would die from hooking, handling, or natural mortality.

When those numbers are put in perspective of the existing magnitudes of the sport harvest, commercial harvest, and escapement, it is clear that only the sport harvest is truly affected by the minimum size regulation. Abolishing the sport fish harvest by 55% (Appendix B, Table 2).

## Appendix B

Figure 1. The Fate of Hooked and Released Undersized Chinook Salmon.



## Appendix B

Table 1. The Fate of Hooked and Released Undersized King Salmon.

7,200	72% Die
2,000	20% Harvested
400	4% Alaskan Spawners
<u>400</u>	4% Non Alaskan Spawners
10,000	100% Total Hooked and Released

## Appendix B

Table 2. Costs and Benefits of Eliminating the Size Restriction for King Salmon.

Current Balance (Average Number of Chinook Salmon)	Gains	Losses	Percent Change
Sport Harvest	18,000	10,000	55% Increase
Commercial Harvest	330,000	2,000	<1% Decrease
Alaskan Spawners	50,000	400	<1% Decrease
Non Alaskan Spawners	1,000,000	400	<<1% Decrease

